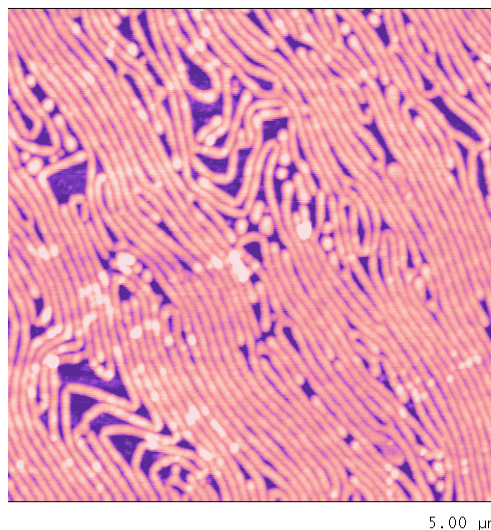
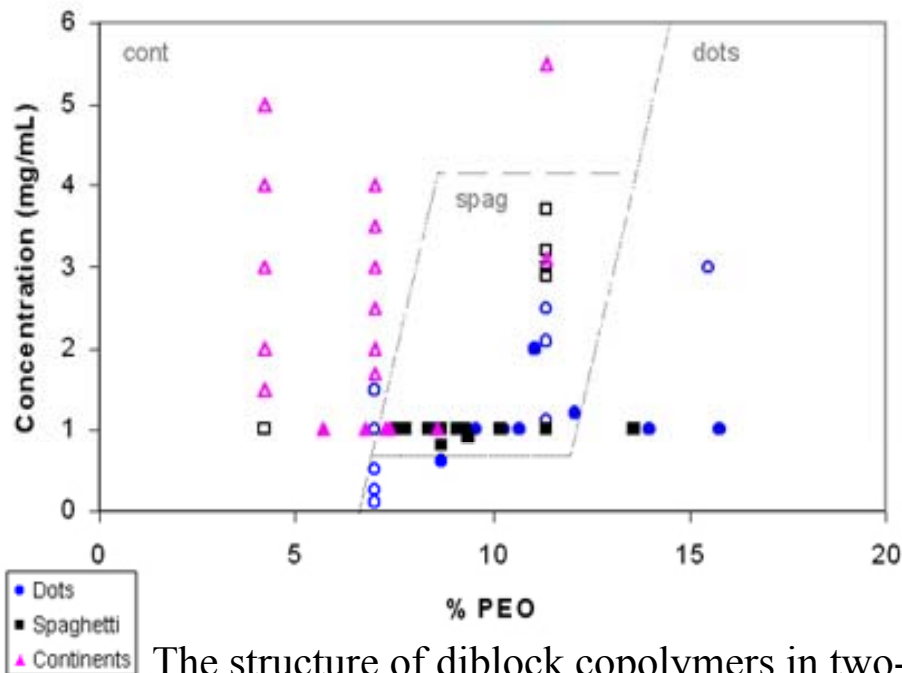


Dynamic Formation of 2-D Structures in Diblock Copolymers

Shenda M. Baker. Harvey Mudd College, DMR-0109077



Left: diagram indicating the conditions under which dots, spaghetti or continents are formed by spreading a solution of PS-b-PEO at an air-water interface.

Right: 5μm x 5μm atomic force microscope image of 10% PEO showing the spaghetti pattern formation.

The structure of diblock copolymers in two-dimensional films can be controlled by trapping the dynamic structures as they form. We have generated for the first time a two-dimensional hydrodynamic model that captures the spreading of a solution of diblock copolymer on an aqueous interface, the evaporation of solvent and the entanglement/vitrification of the glassy block using only the physical constants of the system (no free parameters). The resultant structures are a function of the wt% of the polyethylene oxide (PEO) in the diblock with polystyrene (PS) and the concentration of polymer in spreading solution (above left). All features have a natural correlation length which we can accurately predict. We are currently working on methods to align the stripe or “spaghetti” pattern (above right) to make a topographical and chemical substrate for alignment of biological materials such as collagen.

Hosoi, Devereaux, Kagov*, and Baker Submitted to Science, August 2004, Baker, Lehman* and Devereaux*, to be submitted to Macromolecules (*=undergraduate)*

Dynamic Formation of 2-D Structures in Diblock Copolymers

Shenda M. Baker, Harvey Mudd College, DMR-0109077

Undergraduate students are the driving force for research in the Baker Lab at Harvey Mudd. Students often start research as rising sophomores (such as Scott Kibler '07 and Nick Laude '07, standing on ends) and will continue either in my laboratory or select another discipline either at HMC or on another campus. Over 90% of the chemists at HMC continue on to graduate school within two years of graduation.



Baker Summer Research Group

This year, this project involves the **undergraduate research of Joshua Petrie '05** (standing, second to left) who will continue his summer project into his formal thesis and a post doc who arrives this fall. Other students include **a student from Claremont High School (Afzal Sheikh, not shown)** who was recently admitted and to and attending MIT.